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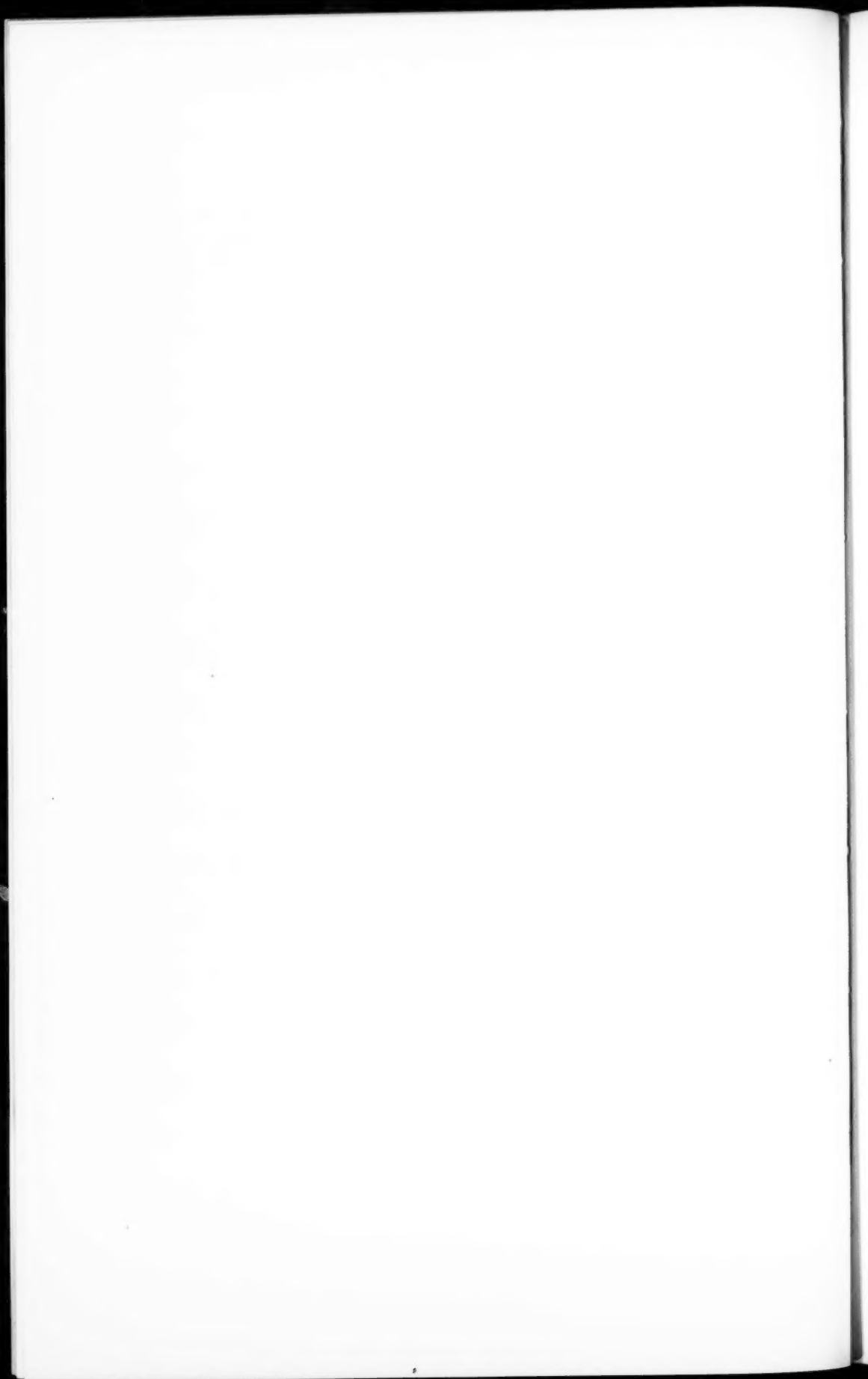
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# AGRICULTURAL HISTORY

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## PLANTATIONS EAST AND SOUTH OF SUEZ

ULRICH BONNELL PHILLIPS<sup>1</sup>

As a lifelong student of plantations in America I was eager to visit similar enterprises in distant lands when the year 1929-1930 chanced to carry me around the world. From Japan to Malaysia my eyes were alert but my ears were in a sense out of service, for I made few contacts on the spot with men who could explain a régime in a language I could understand. Beginning in Ceylon things befell to better effect.

The plantations there are not on such a scale as that of the United States Rubber Company in Sumatra, with its hundred thousand planted acres and its twenty thousand indentured Javanese laborers. The Ceylon units commonly count their acres in mere hundreds and their employees in scores. For that reason the régime in its human aspect is more easily grasped.

I inspected first the Hantane plantation in the mountains near Kandy under the guidance of its manager, Mr. Gordon Pyper. The rubber trees which formerly yielded its main product have now nearly all been replaced with tea shrubs, because the rainfall, of a hundred inches or more, gives sap for a continuous flush of tender shoots—two young leaves and a leaf-bud—which when plucked and processed make the tea of commerce.

<sup>1</sup> Dr. Ulrich Bonnell Phillips is professor of American history at Yale University and author of numerous articles and books on the plantation system, the economics of slavery and antebellum politics. During 1929-30 he was the Albert Kahn fellow, an honor which permitted his making a year's journey around the world. Certain of his observations while on this trip are given in the paper here printed. It was read as the address at the dinner of the Agricultural History Society with the American Historical Association in Boston, Massachusetts, on December 29, 1930. Ed.

The land is valued at some five hundred dollars an acre, for the mountain tract which alone receives heavy rains is limited. The surface lies in very steep slopes. Erosion is accordingly severe, though it is checked by ditching and by sumps which serve the double purpose of diminishing the scour and increasing the soil-water for the tea-bushes downhill.

The shrubs are shaped with some care to present a broad top, waist high, for ease and fullness in the semi-weekly plucking. At the time of my visit gangs of pluckers were in the field, each man or woman with a large, lightly-woven basket rigged behind the shoulders, its mouth yawning to receive the shoots as tossed backward. Some of the women had each a baby astride her hip and embraced by an arm. These could pluck with only one hand. The others kept both hands plying with considerable speed.

When a basket was full it was carried by the plucker to the mill at headquarters, and weighed and recorded. Then a member of the mill crew carried it to the loft and spread its contents upon racks of stretched burlap. When duly wilted the shoots went to machines on the ground floor to be rolled, fermented, rolled again, dried, sifted, picked over, graded and packed. The machines are ingenious though simple, as indeed are all the processes; but quality in the product largely depends upon the skill in gauging and controlling the wilt, the rolling, and the fermentation of the leaves after the first rolling has bruised them.

From Kandy my family party motored through a zone of cocoa plantations but, having made no arrangements in advance, did not stop for even a brief investigation. Then down the side of the rugged plateau and across the coastal plain where natives manage their paddy fields and cocoanut groves without white supervision. From Colombo my wife and I went inland again some twenty miles to visit Mr. Gordon Brooke, manager and part owner of the four rubber plantations of the Hangwella group. Here we inspected an extremely neat hospital at headquarters, and glanced through some elaborate records of work, payments, produce and proceeds. These extend through a long series of years and invite a student's analysis which I could not give. The scale of Mr. Brooke's bachelor bungalow and the splendor of his many objects

of Oriental art were eloquent of a prosperous career and a discriminating taste.

On one of the four plantations of the group we then viewed the clean rubber trees in orderly ranks, the flower-set "coolie lines" as the laborers' village is styled, the little Hindu temple, the concrete swimming pool which is assigned to men at one time and women another, the school room, the day nursery with its own pool in which the bolder youngsters disported, and the mill which is the heart of operations.

The tapping and the collecting of latex, which comprise the morning routine, had ended for the day; but a coolie gave a demonstration of method. With a tool of special design he shaved the thinnest of slices from the bark at the bottom of a sloping scar; and behind his chisel the milky sap emerged at once to flow slowly to the half of a cocoanut shell rigged to receive it. This flow will continue for half an hour or so, then stop until on another day another cut is made. On the trunk of each tree a scale is notched below the slash, limiting the allowance of bark for the six-months season of tapping. Not more than an inch must be cut in the fifteen slices on alternate days through a month. The bark of rubber trees is conserved with a miserly care.

At the mill the latex was arriving in buckets, each tapper bringing some three to five gallons as his morning's take. It was there strained, measured as to volume, tested as to specific gravity, recorded, and in some cases paid for in cash on the spot. Then the mill crew poured it into troughs which already contained a dilute acid. This, as a layman may put it, curdled the milk. After a time the resulting heavy white slabs were lifted from the troughs and passed between rollers again and again to squeeze out the copious water. The result of this very simple process is rubber, which if in the form of *crêpe* is merely hung up to dry, or if in ribbed sheets to smoke, and is then packed and ready for the tire factories of Europe and America. An incidental exhibit was a large accumulation of ribbed sheets being held for better prices. But in the year since then the market level has been steadily lower than at the time of our visit.

The labor at Hantane and Hangwella, and on the rest of the two

thousand plantations in Ceylon, is virtually all Tamil coolies, imported under contract from southern India, hundreds of miles away. The natives of the island prefer their own devices and more leisurely lives. But these Tamils, low-caste and wretchedly poor in their own over-populated land, migrate readily under the control of fellow-Tamils, known as "kanganes," who travel from time to time to the mainland as recruiting agents and the rest of the time live at the top of the Tamil hierarchy on the plantations. The head kangane on an estate draws the equivalent of two cents per day per laborer at work; and each subkangane or gang boss three cents for each worker in his gang. The laborers themselves are mostly paid on a piece-work basis, ranging generally rather less than twenty cents per day in our money. The gross cost of their work, however, is reckoned at about double their money wage, for it includes the charges of transportation from India and of eventual repatriation, the kangane fees, and also the costs of housing and hospitalization and of not merely schooling the children but, as by law required, a noon feeding of them every day. The government of Ceylon maintains an inspection service which seems to be thorough, and the sister government of India concerns itself on occasion to suggest and procure betterments for these temporarily expatriated sons and daughters of hers.

The plantation coolies whom I saw were as a rule in excellent physique and spirits, especially the young ones. At Hantane we chanced to be at headquarters when the children trooped out of the kitchen with their bowls of rice and curry. One youngster marched up to Mr. Pyper and said in Tamil, "There's not enough good stuff on my rice." He was answered, "You are lucky to get any at all," whereupon the whole crowd yelled with merriment at the repartee. On both of the units I visited, the relation between management and labor gave an impression of not merely good temper but of cordiality and affection. The stockholders were in the main residents of far-away England; but the two managers were alike veterans in experience and expert whether in technical process or in human management. Of course a few heart-to-heart talks with coolies might change this estimate; but in default of such correction I think these lonely white men are evoking from

crude labor good service in loyal temper, which means that they are giving a valued *quid pro quo*.

From Colombo we sailed to Suez; and from Cairo, after presenting letters, making inquiries and laying plans, I went up the course of the Nile while my family proceeded to Europe. My first stop was about a hundred miles to the south, at Fashn where conveyance awaited me to Gafadoun Ezbeh, the plantation home of Ragheb Hanna Bey on the verge of the Sahara. My arrival, an hour after nightfall, found the master in his office receiving reports and issuing orders, all of course in Arabic. Adjourning to the living-room above, he began to answer my endless questions in perfect English, for he is a graduate of Oxford, and it was easy for me to forget from time to time that his ancestral roots are among Coptic Egyptians.

But next morning the courtyard view from my window, in a blazing sunlight, was altogether Oriental and ancient. Women swathed in dark blue from crown to heel went back and forth with water jars on their shoulders, though some disturbingly used gasoline cans instead; men led donkeys with sacks of pigeon manure on their rumps to fertilize the orange grove; cow buffaloes and camels varied the scene, which could hardly have been improved for Hollywood purposes.

My host was at my service for the two days of my stay to show me the several estates and explain their operation. Six properties, four of them of plantation scale, are owned by the brothers, the beys Bushra and Ragheb Hanna. The elder is an invalid absentee, and the control is exercised by Ragheb Bey. Much of the land was an inheritance from a grandfather, but more has been acquired since his time. The home place comprises some twenty-five hundred acres, the others are smaller. The value of the land is reckoned at about a thousand dollars per acre. The taxes, about five dollars per acre per year, are surprisingly small in comparison; but Egypt, physically, socially and politically, is a strange land.

Virtually no rain of substantial use ever falls in this zone, or for a thousand miles to the southward. But Nile water is without price to the farmer except that he may have to lift it at "low



Nile;" and its use is not stinted except that when a field has been irrigated for six days the flow must be discontinued for the next twelve. This means a maximum of about nineteen waterings each year from the canals, omitting a month during which they are closed for cleaning and repair. Additional water may be pumped from wells without limit; but this has the disadvantage of some salinity. The growing season is continuous, and the fields in that over-populated land are never given a rest. The chief crop is cotton of the long, silky Sakellarides type; the Hanna product brings a pleasant premium above the standard market basis for that variety; and their output, thanks partly to fertilization and seed selection, averages seven or eight hundred pounds per acre, which is nearly twice the common rate of yield in the district.

Under the law of Egypt a field must not be planted in cotton oftener than once in three years, but this restriction is not rigidly enforced or strictly observed. In the usual rotation cotton is planted in February or March, watered ten times, hoed thrice, and the harvest picked twice and gleaned from the ground. A former third picking has been eliminated by the pink bollworm. To check this pest's ravages the law requires that all cotton stalks be burned. In practice they are cut while still green, stacked on the borders of the fields, and carried by Bedawins, who come in winter from the desert with camels for the purpose, to serve as fuel in the fellah's houses and at the pumping plants. A winter crop following cotton is promptly seeded in November or December, either wheat which requires four or five waters, berseem which takes eight and yields four cuttings of a lush forage, or perhaps beans or barley. As summer crops there follow millet and maize, under which berseem is again seeded before the harvest; and this berseem is off in time for cotton to be planted again in February.

Where the land is rented it is let for the crop, not by the year. On the Hanna properties the rates for the minor crops are determined by competitive bidding at auction among the prospective tenants, usually at about \$35 per acre for a crop of beans, maize or millet, and \$45 for wheat or berseem. But rental for cotton is more commonly on a share basis, partly from considerations of

seed supply, fertilizer and marketing. The tenant furnishes all hand labor and pays one-fourth of other costs, and receives one-fourth of the proceeds. The landlord pays and receives three-fourths. The unit of rental is about two acres for each fellah. (In Egypt the word fellah—emphasized sharply on the second syllable—is equivalent to coolie in the Orient—a common laborer.) Most of the Hanna land, however, is cultivated by wage labor, at rates of twenty to thirty cents per day according to the pressure of the season. The cotton picking is done by women and children at piece rates ranging from some twelve to thirty cents per hundredweight when converted into American weights and money. At the height of the season, the second picking, the rates are at the maximum; but the Sakellarides bolls are very small, the picking slow, and a woman will hardly exceed thirty cents as her best day's earning. For the transport of bundled cotton stalks a camel and his driver cost from sixty cents to a dollar per day, which means that the camel's work is worth more than the man's.

In the general management of the Hanna lands Ragheb Bey is assisted by an agent or steward, who has a salary of \$1200 a year, with a house, a servant and a mount. On each plantation there is an overseer (nazir) in charge, at half this rate of pay and similar perquisites; and under him a field boss (bash kholly) at \$250 with a house and a mount, and several foreman (khollys) at half of this pay, and a house but no horse. There are scores of watchmen, particularly when cotton is ripe in the fields, drawing five or six dollars a month; and in the office at Gafadoun ten or a dozen clerks to keep records in a neat Arabic script. There is also a clerk at Fashn, the shipping point, and two more in an office at Cairo.

Another employee, of an unexpected and exotic sort, is an Albanian bodyguard who slings a shotgun on his shoulder, clutches a green umbrella under his arm, and follows at a few paces whenever his master leaves his house. When a motor car is used the Albanian has a seat with the chauffeur. His umbrella is to shade the master's eyes and skin from excessive glare; the gun is to discourage would-be assassins, two of whom have attacked Ragheb Bey in former years. This is a discordant note in an otherwise

patriarchal scene. On a plantation in Mississippi many years ago, I saw an overseer with a pistol habitually on his thigh; but in the rest of my plantation travels at home and abroad I have encountered no other instance of armament until this. It is curious that this body-guarded proprietor is a native among natives, inspecting ancestral acres. But, again, Egypt is a curious land.

Field operations at Gafadoun are a striking mixture of the very old and the very new. In one field a dozen ploughs, each drawn by a wide-spanned pair of bullocks, were breaking the ground. These implements are of ancient pattern—the share is a mere log with an iron sheathing at the point; the handle is a single upright post. When the furrow threatens to be too shallow, the ploughman simply steps upon the share to deepen the cut! But at another place a pair of steam ploughing machines stood on opposite sides of the field and alternately wound a steel cable upon their drums to drag a great up-to-date gang-plough to and fro. Likewise at the master's home electricity gives illumination; but the water supply for the modern plumbing is pumped to a tank on the roof by two blind men, "who would otherwise have nothing to do." And in a nearby barn, spoiled beans for use in the flood-time feeding of the thousands of pigeons in the huge clay cote were being ground by two women using as a mill a bare stone revolved upon another by human muscle. Man-power is so cheap, and custom so strong, that the use of machinery has unexpected limitations. One factor in the situation is that Egypt, without forests, coal or petroleum, has no local fuel but cotton stalks, sugar-cane bagasse and buffalo dung. At the same time land is so precious, wherever irrigation will reach, that the mud houses of the fellahs are so thickly crowded in villages that oftentimes the only place available for forage or fuel to be stored is on the flat roofs of these hovels.

From Fashn a night's run southward by train took me to Kom Ombo not far short of Assouan. The Nile valley for many miles above and below is little wider than a gorge; but here occurs a broad, flat shelf of sandy loam some seventy feet above the level of low Nile. This was unreclaimed until the present century when the Kom Ombo Land Company procured title, installed



great steam-driven centrifugal pumps and laid out canals to lead the lifted Nile water and convert the desert into the sown. The original promoters, including an English baronet, made something of a failure at cotton; but the present proprietors and managers have succeeded with sugar as the main crop to such effect that at the time of my visit they were lengthening their canals to enlarge their twenty-six-thousand-acre enterprise. They are steadily willing, however, to sell tracts at prices of \$300 to \$500 per acre, according to quality, subject to a charge of \$20 annually per acre for pumped water. The cost of irrigation is enhanced by the porousness of the plateau soil; for by far the greater part of the water promptly seeps back to the Nile.

My guide over the fields was a French engineer in the company's employ. Our vehicle was a tiny car drawn by a donkey under a fellah's lash on a very narrow railroad. When we met a locomotive we politely gave way by lifting our car off the track. The path bordered fields of ripening cane set in rows less than thirty inches apart and grown so dense that a man could hardly force his way through the crop. Other fields were in other crops, or briefly bare after harvest; and sometimes there was an enclave of desert lying a little too high for canal-water to reach. One of these was likely to contain a treeless, bald and unhomelike village of mud huts. Here and there also were temporary threshing grounds on which fellah families by the score were driving donkeys, cattle and buffaloes, tethered indiscriminately, round a central stake on each man's floor to tread the millet from the heads. To toss the grain into the wind was the method of winnowing. Alongside the railroad in each threshing field an agent of the company was posted with scales, to take the rental grain from each fellah's threshing.

At headquarters I was happy to find that the superintendent, Mustafa Raafat Bey, who has had more than twenty years of service on the place, could speak a comfortable English. The minor crops, he said, including wheat and cotton, are grown by tenants who pay fixed weights of each product per unit of area leased,—the company breaking the land, whether by machines or with bullocks, as well as furnishing water. Most of the seven

thousand acres in sugar cane, however, are cultivated by the company with hired labor. This is the more expedient because of the four-year cycle in that crop.

To begin the cycle, the cane is planted in February, and irrigated and otherwise tended for thirteen months until harvest in March. Then the litter is burned, the field watered to sprout the "ratoon" crop from the old roots, then manured and ploughed with bullocks, then watered repeatedly and ploughed once more, then harvested in February. Repetitions of this eleven-months ratoon process brings a January harvest in the third year, and a final December cutting in the fourth. The yield has dwindled in each year of the cycle; and now the field is left without water for four months to kill the roots by drought. The rest of the fifth year is given to maize or millet, followed by berseem, whereupon in February of the sixth year a new cycle of cane may be begun.

The rate of wages for fellahin is twenty cents per day; and many have migrated for long distances to embrace this opportunity. Some few may make a bit more by contracting for piece-work.

Mustapha Bey had a busy afternoon, though it was presumably not unusual except for the presence of a listener who would grasp nothing until its gist was translated for his benefit. One by one from a swarm in the yard outside, fellahin were admitted by the doorkeeper, each as a rule bringing a chit from the chief clerk or some other subordinate official. Each advanced to the front of the desk, saluted, presented his chit and explained his case unless the superintendent initialed it of his own motion. If a request was denied, Mustapha Bey tore up the chit; and the doorkeeper lent his voice and gesture in speeding the fellah's exit. Among half a hundred instances were these:

A watchman whose negligence had permitted a field of maize to burn had been fined two pounds Egyptian (\$10). That his family might be fed, he asked that £1 in value be taken from his millet crop and the rest carried against his wheat which was then being seeded. The petition was granted.

A fellah proposing to make a contract for cutting fifteen feddan (virtually fifteen acres) of cane in the coming harvest at £2 per

feddan asked for an advance of £10 with which to bring helpers from a distance, without endorsement of a second name on his contract. He said he had done this in previous years. He was given a chit to the chief clerk inquiring as to his record. Upon return with a favorable notation, his request was approved.

Another with an identical desire went through the same routine but brought back a notation of unsatisfactory record, and met a decision that he must procure an acceptable endorser if he was to proceed with his purpose.

A non-employee fellah asked to rent a house, and an employee relative endorsed him. The application was granted. A standard fellah hut at Kom Ombo, by the way, costs about twenty dollars to build, and rents for a dollar a month. But employees and their families are housed rent-free.

An employee who had previously endorsed an outsider as the tenant of a house gave notice terminating his endorsement. He was released from future liability.

A tenant applied for additional land for cropping wheat. He was given a notation that this was to be granted or denied according to whether land in his village area was available.

The only woman of the afternoon, one recently widowed, asked for a maintenance grant for herself and her children to be carried as a charge against their future earnings. Granted.

When the stream of applicant fellahin ended, or perhaps was cut off till another day, there followed a conference of the executive staff. So far as I could identify these there came the two immediate lieutenants of Mustapha Bey, the sixteen nazirs, or unit overseers, and two omdas. An omda, as I gather, is rather a civil than industrial functionary, superior to the sheiks or village chiefs in his district. Why these two participated in this conference, which dealt with rates to be paid for certain sorts of work in the sugar-cane harvest I cannot say. Their faces, along with sundry brown or blackish others, were finely chiseled; and the voices in the brisk discussion were excellent. But as to the outcome in detail this deponent saith not. Night had fallen; morning took me to Shellal above the dam at Assouan; and three days more by water and then by rail across the glaring desert carried the traveler to Khartoum.

The White Nile, flowing from the far South, meets at Khartoum the Blue Nile from Abyssinia. Both are misnamed, for the waters of both carry clay in suspension and they vary only in their tones of yellow-brown color. The steady, strong flow of the White is the main reliance for year-round irrigation on all the fields below; the Blue, famous for its turgid annual spate, furnishes the historic floods of Egypt with their fertilizing deposits of silt. A large part of the flood, even today, flows into the Mediterranean and is lost for irrigation purposes. A substantial portion, however, is impounded by the great dam at Makwar, a hundred and seventy miles above Khartoum, and in due time sluiced upon the fields of the Sudan Plantations Syndicate. This undertaking lies in a district known as the Gezira—also misnamed, for the term in Arabic means island, whereas the tract is a tongue of land, an African Mesopotamia, comprising some five million acres between the two streams.

On a December morning I took a train to follow the left bank of the Blue Nile and see the syndicate's enterprise. The region seen is a vast plain of heavy brown soil, with a lift of no more than a foot per southward mile—its dead level relieved only by small mounds where the loess of dust-storms has accumulated about acacia bushes. For a dozen miles out of Khartoum these bushes rise from bare ground, or else they stand amid thin, coarse, pale-brown grass which has had no rain since the summer. The rainfall here is a mere five inches in annual average. There are no signs of animal or human life except a seldom flock of goats feeding on the dead grass, or a string of camels with its driver.

The next hour brings a change of scene by carrying the traveler into a zone of less niggard rainfall. Thin crops of millet appear in fields which are bounded on their lower sides by ridges to gather and hold the precious rain. Here and there men are at work in groups of three to build or repair such ridges. One of each three guides a tool which looks like a wooden snowshovel while the other two drag it forward with ropes. In the distance here and there a flat-roofed mud village is lifted by mirage in the shimmering glare.

Thus far the scene is as the conquering Kitchener must have

seen it in 1898, or any preceding visitor in untold centuries during which these dry-farming natives have eked an existence. But some fifty miles from Khartoum came signs of modern times, with steam shovels building a canal to extend the syndicate's irrigation. And then the crop land with tall millet of the usual sorghum-like sort, low lubia for grazing and perhaps a harvest of beans, and cotton fields in bloom; and in open spaces ploughing machines breaking the ground. Some twenty miles of travel through this landscape brought me to the plantation headquarters at Barakat, where for two days I was taken in charge by the staff. We motored for endless miles through the crops; I was shown canals great and small, their surfaces always high enough to "command the field" and their flow controlled and measured at sundry points by special apparatus. I was taken to the experiment farm where new strains of seed are tested and campaigns planned against pests. A gesture located the seed farm where approved strains are bred on a scale to supply the whole plantation. I was led through a great ginnery and shown the machines with their thick cylinders of rough buffalo hide to drag the long Sakellarides lint from the black seed without breakage. And even at meals and at a polo game I was crammed with all the data I could ask for.

The great project had its conception in the first years of the twentieth century, and its fruition in 1925. The interim saw surveys of the terrain, analyses of the human factors, enactment of laws, incorporation of the company, negotiations in high finance, construction of the railroad, the dam and the canals, experimentation in crops, and the careful devising of a system of uniform leases, a schedule of crop rotation and a calendar of seed-time and harvest. There was also an expanding cultivation by use of pumped water for the sake of training an administrative staff and habituating the native population against the time when water would begin to flow by gravity through the big ditch from forty miles upstream. The world war suspended construction, of course, but did not halt all the minor proceedings.

In the pre-syndicate phase the land of the district was owned in parcels of irregular shape by "Arab" natives who, as they still



do, dwelt in their characteristic villages and went forth to their scattered fields only when occasion required. To facilitate the new project the government took over such land as was wanted on a rental of some fifty cents per acre per year, payable to the native proprietors; and the syndicate, so far as feasible, made the same proprietors its own profit-sharing tenants.

The lay-out of the canals divides the land into uniform plats of ten acres, three of which comprise the standard unit of tenantry to be cultivated under the syndicate's control. A definite schedule provides that in any year one of the three plats in rotation shall be planted in cotton, a second substantially half in millet for human food and half in the leguminous lubia for green forage, while the third plat rests in dry fallow. The contract of lease requires the tenant to furnish all needed manual labor and entitles him to all the millet and lubia and forty per cent of the proceeds of the cotton. The syndicate, which provides the minor canals, ploughs the fields with its sixty steam or Diesel machines, furnishes seed, advances seasonal funds as may be needed by tenants, gins and markets the crop, and maintains an elaborate control at all points and stages, takes a variable twenty to twenty-five per cent of the cotton proceeds; and the Sudan government receives the remaining thirty-five or forty per cent of the cotton proceeds as a return upon its investment of some sixty million dollars in the dam and the major canals.

Gravity flow came from the dam in the first instance at the middle of July, 1925; and eight thousand ten-acre plats were promptly seeded in cotton, as well as corresponding acreages in food and feed. The harvest of the following winter and spring was copious; the prices realized upon the cotton were high; and a shortage of rains round about caused an eager demand for any surplus of millet from these irrigated fields. The proceeds to all concerned were handsome; and natives from outside applied in thousands for contracts of lease. Next year the results were similarly good; and the plantation expanded to the full scale as then intended, of three hundred thousand acres, a third as always in cotton, a third in food and forage, a third in dry fallow. The two more years which have since elapsed have brought some lessening

of prosperity through an increase of pests among the cotton plants and a decline of cotton prices; but the syndicate is expanding its area to 450,000 acres, and another corporation, the Kassala Company, has opened an adjacent tract of 45,000 acres to be watered from the same source by an enlargement of the main canal. The land available in the Gezira would permit a quadrupling of these dimensions; but considerations of the water supply and of Egypt's claims upon it are likely to prevent an indefinite expansion.

The type of cotton grown yields a lint slightly finer than Egypt's product, and brings the best prices quoted in the world's market. The pests afflicting the crop include most of those known elsewhere, except for the pink worm and the Mexican weevil; and to these are added as local plagues a "black arm" fungus which causes the leaves to shed, and "thrips," which are insects likewise causing defoliation. In fact afflictions are plenty; but in the face of them the output per acre has run on an average about four hundred pounds of superfine lint, which invites envy from the rest of the cotton-growing world.

Seed time comes in July, when rains relieve the need of much irrigation until September. The millet is given only two waters, the lubia four; but usually fifteen, along with much cultivation, are lavished upon the cotton. This begins to open its bolls in January. The picking, usually done six times, extends thence until May. This work needs nearly a hundred thousand laborers additional to the regular corps. In response to the call a multitude treks from the White Nile and beyond, and pilgrims by the thousand on their way to or from Mecca halt for a season of employment. Many of these have come a thousand miles or more from beyond Lake Chad, and some will pause for years instead of months. Most of the working personnel is of the various Arab stocks, though much of it is Negro. Many of the leaseholders, affluent from several years of unexampled prosperity, now take life easy, functioning rather as employers of labor than as working tenants.

To let Egypt enjoy the full flow of the Blue Nile in the season of low water, and also to diminish insects and fungi in the Gezira

fields by drought in the hottest months, irrigation is discontinued each year from mid-April to mid-July. This incidentally decimates mosquitoes which one year spread a plague of malaria.

The phenomenal success of this prodigious enterprise is due mainly to the foresight, intelligence and vigor of the management. The managing director of the syndicate is now Mr. Alexander MacIntyre who has been in the service of the company for more than twenty years; and most of the rest of the staff at headquarters are in some degree veterans. In the field, in a hierarchy of their own, are nearly a hundred inspectors, each official of junior grade living on the tract of some five thousand acres which he supervises. These men are in the main recruited as they graduate from British universities and are given most of their training on the plantation. At a stockholders' meeting in London Mr. MacIntyre said:

"It was necessary to build up a supervisory staff whose ability is unquestionable and who also have the necessary qualifications to treat our tenants and all workers with consideration, sympathy and tact. This, I may tell you, was no easy task in a climate so trying as we have in the Sudan, where a young man has to be of sterling quality all through to meet the demands put upon him by the Management and by his varied and arduous occupation. I feel, gentlemen, that we have got the right men, and that you have in the Sudan a staff of which you may well be proud."

My own impressions justify the managing director's praise. The investors have doubtless been content with the dividends of twenty-five per cent paid in each of the last four years on the £2,250,000 sterling of capital stock.

This, the largest, was also the last of the plantations I visited, for my travel thence led to central Africa where the naked, pagan, tribal Negroes are as yet untouched by projects of organized industry.

Some general remarks remain. In history plantations preceded factories by two or three centuries, even if medieval manors and Roman *latifundia* be disregarded. But now for a century, while a great increase of machinery and of specialization in human tasks has concentrated most manufacturing into large units, the aboli-



tion of slavery, the growth of government functions in farm experiment, and a cult of rural democracy have widely conspired in favor of smaller units in agriculture. In our day communism as represented in the huge "state farms" of Soviet Russia runs counter to this, and capitalism applies its favorite corporation form wherever conditions are inviting. These appear chiefly in the tropic zone because its climate permits continuous functioning and because its more or less primitive population produces goods more copiously when under systematic routine control. In some industries, additionally, mechanical processing of the harvested product, carrying a factory to the field, offsets the consumption of time by the trudge of laborers to distant tracts and makes it specially worth while to agglomerate land and labor.

Opportunity for such recourse is not without limits. Occurrence of success anywhere invites duplication by rivals and a multiplication of units to the point of over-exploitation. An excess of output gluts the market; prices collapse and prosperity vanishes just as in factories when capacity reaches excess. But while factories may somewhat readily close their doors until demand revives, plantations, like other farms, can hardly cease functioning at short notice. They are "going concerns" in a somewhat special sense. When the staple product is an annual such as cotton, low price at seed-time does not forbid hope of uplift ere harvest. The perennial character of sugar cane prolongs this interval into a term of years; and the span of life possessed by tea shrubs and rubber trees gives contemplation of harvests without end. The grip of circumstance is therefore somewhat specially strong. By their own efficiency plantations tend to spoil their markets. Meanwhile they carry the ways of the West into the East and of the North into the South, with impingements yet to be reckoned.

## THE ADOBE BRICK AS A HISTORICAL SOURCE

### REPORTING FURTHER STUDIES IN ADOBE BRICK ANALYSIS

GEORGE W. HENDRY<sup>1</sup>

Students of agricultural history from the middle of the seventeenth century onward have found occasion to comment upon the dearth of exact knowledge regarding the early introduction of crop and weed plants into America, and particularly upon our ignorance of the precise identity of such plants. Comparatively recently, Horace Davis, in writing a history of wheat in California, expressed this thought as follows: "Among other food supplies, they (the Spanish missionaries) sowed wheat; what variety it was, or whence it came, we have no means of knowing."<sup>2</sup>

This statement, often repeated and until now generally accepted, is no longer tenable, for as will be shown several of these varieties have now been accurately determined. Similarly, some of the current ideas regarding weed introduction are also challenged by the data here presented. A case in point is S. B. Parish's view that no alien weed species had penetrated Alta California prior to colonization in 1769.<sup>3</sup>

<sup>1</sup> Assistant professor of agronomy in the University of California and associate agronomist in the California Agricultural Experiment Station. The paper here printed summarizes all contributions to date through the method of adobe brick analysis and is a continuation of earlier studies reported in a paper, "The Plant Content of Adobe Bricks," in the *California Historical Society Quarterly*, IV, 361-373 (December, 1925). The present paper was presented in substance at the Des Moines meeting of the A. A. A. S. in December, 1929. The author gratefully acknowledges the assistance of Mrs. Margaret Kelly Bellue, formerly seed analyst in the California State Department of Agriculture, in the determination of weed species.

<sup>2</sup> Horace Davis, *California Breadstuffs* (Chicago, 1894), 518. Reprinted from the *Journal of Political Economy*, No. 2.

<sup>3</sup> S. B. Parish, "The Immigrant Plants of Southern California," in *Southern California Academy of Science*, XIX, pt. 4 (1920), 3.

## TESTIMONY OF THE ADOBE BRICK

After a vain search of the historic literature for reference to the varietal identity of the wheats grown in California during the Spanish period, the thought occurred of seeking for the remains of such wheats in the adobe walls of the buildings erected here during that period, and, pursuing this idea, it was found that such walls not only contained cereal plant remains in abundance, but quantities of weeds and other plant materials as well. Also that the sun-dried bricks composing such walls may be easily disintegrated in water, following which they yield their plant material in a good state of preservation.

To date, fourteen adobe structures in Upper and Lower California, Arizona, and Sonora have been studied from this viewpoint and all of the identifiable plant remains recovered from them have been arranged taxinomically below under the sub-captions: Crop Remains from Various Historic Buildings; and Weed Remains from Various Historic Buildings. Under these headings, all plant materials collected to date are listed, including new material from Arizona, Sonora, and Lower California, not previously reported.

## CROP REMAINS FROM VARIOUS HISTORIC BUILDINGS

Name	Building	Date of Foundation	Locality
Propo wheat, <i>Triticum vulgare</i> <i>graecum</i> Keke.	San Cayetano del Tumacacori	1701	Southern Arizona
	San Valentin	1706	N. W. Sonora, Mexico
	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
	San Antonio de Padua	1771	Jolon, California U. S. A.
	Santo Domingo	1775	Santo Domingo, B. C. Mexico
	San Vincente Ferrer	1780	San Vincente, B. C. Mexico
	La Soledad	1791	Soledad, Calif. U. S. A.
	San Jose de Guadalupe	1797	Mission San Jose, Calif. U. S. A.
	San Juan Bautista	1797	San Juan Bautista, Calif.

Name	Building	Date of Foundation	Localit.
Unknown, <i>Triticum vulgare albidum</i> Al.	Rancho El Sansal	1834*	Salinas, Calif. U. S. A.
	Rancho Vallejo	1834-45†	Petaluma, Calif. U. S. A.
	Rancho La Natividad	1837*	Salinas, Calif. U. S. A.
	La Soledad	1791	Soledad, Calif. U. S. A.
	San Juan Bautista	1797	San Juan Bautista, Calif.
	San Francisco de Solano	1824	Sonoma, Calif. U. S. A.
Little Club wheat, <i>Triticum compactum humboldtii</i> Keke.	San Cayetano del Tumacacori	1701	Southern Arizona
	San Valentin	1706	N. W. Sonora, Mexico
	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
	San Antonio de Padua	1771	Jolon, Calif. U. S. A.
	La Soledad	1791	Soledad, Calif. U. S. A.
	San Fernando Rey de Espana	1797	San Fernando, Calif., U. S. A.
	San Jose de Guadalupe	1797	Mission San Jose, Calif. U. S. A.
	San Juan Bautista	1797	San Juan Bautista, Calif., U. S. A.
	San Francisco de Solano	1824	Sonoma, Calif. U. S. A.
	Rancho El Sansal	1834	Salinas, Calif. U. S. A.
	Rancho Vallejo	1834-45	Petaluma, Calif. U. S. A.
	Rancho La Natividad	1837	Salinas, Calif. U. S. A.
	San Valentin	1706	Southern Arizona
	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
	La Soledad	1791	Soledad, Calif. U. S. A.
California Club wheat, <i>Triticum compactum erinaceum</i> Keke.			

\* Mexican grant.

† Date of erection.

Name	Building	Date of Foundation	Locality
Coast barley, <i>Hordeum vulgare pallidum typica</i> Ser.	San Jose de Guadalupe	1797	Mission San Jose, Calif. U. S. A.
	San Juan Bautista	1797	San Juan Bautista, Calif.
	San Cayetano del Tumacacori	1701	Southern Arizona
	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
	San Antonio de Padua	1771	Jolon, Calif. U. S. A.
	Santo Domingo	1775	Santo Domingo, B. C. Mexico
	San Vincente Ferrer	1780	San Vincente, B. C. Mexico
	La Soledad	1791	Soledad, Calif. U. S. A.
	San Fernando Rey de Espana	1797	San Fernando, Calif. U. S. A.
	San Jose de Guadalupe	1797	Mission San Jose, Calif. U. S. A.
	San Juan Bautista	1797	San Juan Bautista, Calif. U. S. A.
	San Francisco de Solano	1824	Sonoma, Calif. U. S. A.
	Rancho El Sansal	1834	Salinas, Calif. U. S. A.
	Rancho La Natividad	1837	Salinas, Calif. U. S. A.
Red oat, <i>Avena byzantina</i> G. Koch.	San Vincente Ferrer	1780	San Vincente, B. C. Mexico
	San Jose de Guadalupe	1797	Mission San Jose, Calif. U. S. A.
	Rancho Vallejo	1834	Petaluma, Calif. U. S. A.
European oat, <i>Avena sativa</i> L.	Rancho Vallejo	1834	Petaluma, Calif. U. S. A.
Wild oat, <i>Avena fatua</i> (?) L.	San Juan Bautista	1797	San Juan Bautista, Calif. U. S. A.
Indian corn, <i>Zea mays</i> L.	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
	San Vincente Ferrer	1780	San Vincente, B. C. Mexico
	La Soledad	1791	Soledad, Calif. U. S. A.

<i>Name</i>	<i>Building</i>	<i>Date of Foundation</i>	<i>Locality</i>
Red Mexican, or Pink bean, <i>Phaseolus vulgaris</i> L.	La Soledad	1791	Soledad, Calif. U. S. A.
Pea, <i>Pisum sativum</i> L.	San Francisco de Solano	1824	Sonoma, Calif. U. S. A.
Cucurbit (?)	La Soledad	1791	Soledad, Calif. U. S. A.
	San Vincente Fer- rer	1780	San Vincente, B. C. Mexico
Watermelon, <i>Citrullus vul- garis</i> Schrad.	Rancho La Nativi- dad	1837	Salinas, Calif. U. S. A.
Carrot, <i>Daucus carota</i> L.	San Vincente Fer- rer	1780	San Vincente, B. C. Mexico
	Rancho La Nativi- dad	1837	Salinas, Calif. U. S. A.
Rose, <i>Rosa</i> sp. L.	San Jose de Gua- dalupe	1797	Mission San Jose, Calif. U. S. A.
Fig, <i>Ficus carica</i> L.	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
Seedling peach, <i>Prunus per- sica</i> Sieb. and Zucc.	San Vincente Fer- rer	1780	San Vincente, B. C. Mexico
Olive, <i>Olea europaea</i> L.	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
	Santo Domingo	1775	Santo Domingo, B. C. Mexico
	San Vincente Fer- rer	1780	San Vincente, B. C. Mexico
	La Soledad	1791	Soledad, Calif. U. S. A.
	San Fernando Rey de Espana	1797	San Fernando, Calif. U. S. A.
	Rancho La Nativi- dad	1837	Salinas, Calif. U. S. A.
European grape, <i>Vitis vinifera</i> L.	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
	Santo Domingo	1775	Santo Domingo, B. C. Mexico
Spanish Bayonet, <i>Yucca</i> sp. L.	San Cayetano del Tumacacori	1701	Southern Arizona U. S. A.
Spanish Dagger, <i>Yucca mo- havensis</i> Sarg.	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
Maguey, <i>Agave</i> sp. L.	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
Maguey, <i>Yucca</i> (?) or <i>Nolina</i> (?)	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
<i>Scirpus</i> , <i>Cyperus</i> , or <i>Zea</i>	San Fernando de Velicata	1769	San Fernando, B. C. Mexico

Name	Building	Date of Foundation	Locality
Prickly pear, <i>Opuntia occidentalis</i> Engelm. and Bigel.	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
	Santo Domingo	1775	Santo Domingo, B. C. Mexico
	San Vincente Ferrer	1780	San Vincente, B. C. Mexico
	San Fernando Rey de Espana	1797	San Fernando, Calif. U. S. A.
Fan palm, <i>Livistona rotundifolia</i> Mart.	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
Osage orange, <i>Toxylon pomiferum</i> Raf.	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
Juniper, <i>Juniperus</i> sp.	Santo Domingo	1775	Santo Domingo, B. C. Mexico
Bamboo, <i>Phyllostachys</i> sp. Sieb. and Zucc.	Santo Domingo	1775	Santo Domingo, B. C. Mexico
Palo Escopeta, <i>Albizia occidentalis</i> T. S. Brandeg.	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
California Pepper Tree, <i>Schinus Molle</i> L.	Santo Domingo	1775	Santo Domingo, B. C. Mexico
	La Soledad	1791	Soledad, Calif. U. S. A.

## WEED REMAINS FROM VARIOUS HISTORIC BUILDINGS

Name	Building	Date of Foundation	Locality
Brome grass, <i>Bromus</i> sp. L.	San Jose de Guadalupe	1797	Mission San Jose, Calif. U. S. A.
Rye-grass, <i>Lolium</i> sp. L.	San Antonio de Padua	1771	Jolon, Calif. U. S. A.
Italian rye-grass, <i>Lolium multiflorum</i> Lam.	Santo Domingo	1775	Santo Domingo, Calif. U. S. A.
Rye-grass, <i>Lolium</i> sp. L.	Rancho Vallejo	1834	Petaluma, Calif. U. S. A.
Walk grass, <i>Poa annua</i> L.	San Juan Bautista	1797	San Juan Bautista, Calif. U. S. A.
Wild oats, <i>Avena</i> (See above under Crop Remains from Various Historic Buildings)			
Wall barley, <i>Hordeum murinum</i> L.	Santo Domingo	1775	Santo Domingo, B. C. Mexico
	San Vincente	1780	San Vincente, B. C. Mexico
<i>Hordeum pusillum</i> Nutt.	Santo Domingo	1775	Santo Domingo, B. C. Mexico
	Rancho La Natividad	1837	Salinas, Calif. U. S. A.



Name	Building	Date of Foundation	Locality
Wall barley, <i>Hordeum</i> sp. L.	San Jose de Guadalupe	1797	Mission San Jose, Calif. U. S. A.
Wild rye, <i>Elymus triticoides</i> Buckl.	Santo Domingo	1775	Santo Domingo, B. C. Mexico
	San Vincente	1780	San Vincente, B. C. Mexico
	La Soledad	1791	Soledad, Calif. U. S. A.
	Rancho La Natividad	1837	Salinas, Calif. U. S. A.
<i>Polypogon lutosus</i> (Poir.) Hitchc.	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
Spear grass, <i>Stipa</i> sp. L.	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
Galingale, <i>Cyperus</i> sp. L.	San Antonio de Padua	1771	Jolon, Calif. U. S. A.
	Santo Domingo	1775	Santo Domingo, B. C. Mexico
	San Vincente	1780	San Vincente, B. C. Mexico
	Rancho El Sansal	1834	Salinas, Calif. U. S. A.
Kyllinga (?), <i>Kyllinga</i> sp.? Rott.	San Vincente	1780	San Vincente, B. C. Mexico
Spike-Rush, <i>Eleocharis</i> sp. R. Br.	San Jose de Guadalupe	1797	Mission San Jose, Calif. U. S. A.
Tule, <i>Scirpus</i> sp. L.	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
	Santo Domingo	1775	Santo Domingo, B. C. Mexico
	San Vincente	1780	San Vincente, B. C. Mexico
	San Francisco de Solano	1824	Sonoma, Calif. U. S. A.
	Rancho La Natividad	1837	Salinas, Calif. U. S. A.
Sedge, <i>Carex</i> sp. L.	San Vincente	1780	San Vincente, B. C. Mexico
	San Fernando Rey de Espana	1797	San Fernando, Calif. U. S. A.
Knotweed, <i>Polygonum hydro-piperoides</i> Michx.	La Soledad	1791	Soledad, Calif. U. S. A.
Curly Dock, <i>Rumex crispus</i> L.	Santo Domingo	1775	Santo Domingo, B. C. Mexico
	San Vincente Ferrer	1780	San Vincente, B. C. Mexico



Name	Building	Date of Foundation	Locality
	La Soledad	1791	Soledad, Calif. U. S. A.
	Rancho Vallejo	1834	Petaluma, Calif. U. S. A.
	Rancho La Natividad	1837	Salinas, Calif. U. S. A.
White Pigweed, <i>Chenopodium album</i> L.	La Soledad	1791	Soledad, Calif. U. S. A.
	Rancho La Natividad	1837	Salinas, Calif. U. S. A.
Winged Goosefoot, <i>Chenopodium murale</i> L.	Santo Domingo	1775	Santo Domingo, B. C. Mexico
	San Vicente	1780	San Vicente, B. C. Mexico
	San Fernando Rey de Espana	1797	San Fernando, Calif. U. S. A.
	San Juan Bautista	1797	San Juan Bautista, Calif. U. S. A.
Jerusalem Oak, <i>Chenopodium botrys</i> L.	San Jose de Guadalupe	1797	Mission San Jose, Calif. U. S. A.
Soap Plant, <i>Chenopodium californicum</i> Wats.	San Vincente Ferrer	1780	San Vincente, B. C. Mexico
Pig Weed, <i>Chenopodium</i> sp. (pitted seed)	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
	Santo Domingo	1775	Santo Domingo, B. C. Mexico
	Rancho El Sansal	1834	Salinas, Calif. U. S. A.
	San Vincente Ferrer	1780	San Vincente, B. C. Mexico
Spear Orache, <i>Atriplex patula</i> L.	Rancho La Natividad	1837	Salinas, Calif. U. S. A.
Salt bush, <i>Atriplex</i> sp. L.	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
Sea Blite, <i>Suaeda suffrutescens</i> Wats. (?)	Rancho Vallejo	1834	Petaluma, Calif. U. S. A.
Rough Pigweed, <i>Amaranthus retroflexus</i> L.	San Cayetano del Tumacacori	1701	Southern Arizona U. S. A.
Tumble Weed, <i>Amaranthus graecizans</i> L.	La Soledad	1791	Soledad, Calif. U. S. A.
Umbrella-wort, <i>Allionia</i> sp. Loeffl.	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
Purslane, <i>Calyptidium monandrum</i> Nutt.	San Vincente Ferrer	1780	San Vincente, B. C. Mexico
Red Maids, <i>Calandrinia</i> sp. H. B. K.	La Soledad	1791	Soledad, Calif. U. S. A.

Name	Building	Date of Foundation	Locality
	San Juan Bautista	1797	San Juan Bautista, Calif. U. S. A.
	Rancho La Natividad	1837	Salinas, Calif. U. S. A.
Miner's Lettuce, <i>Montia perfoliata</i> (Donn) Howell	San Antonio de Padua	1771	Jolon, Calif. U. S. A.
	Rancho Vallejo	1834	Petaluma, Calif. U. S. A.
<i>Montia</i> sp. L.	La Soledad	1791	Soledad, Calif. U. S. A.
Catch-fly, <i>Silene</i> sp. L.	Rancho La Natividad	1837	Salinas, Calif. U. S. A.
Creeping Crowfoot, <i>Ranunculus repens</i> L.	San Francisco de Solano	1824	Sonoma, Calif. U. S. A.
Buttercup, <i>Ranunculus</i> sp. L.	San Jose de Guadalupe	1797	Mission San Jose, Calif. U. S. A.
Black Mustard, <i>Brassica nigra</i> (L.) Koch.	Santo Domingo	1775	Santo Domingo, B. C. Mexico
	San Vincente Ferrer	1780	San Vincente, Calif. U. S. A.
	La Soledad	1791	Soledad, Calif. U. S. A.
Mustard, <i>Brassica</i> sp. L.	San Vincente Ferrer	1780	San Vincente, B. C. Mexico
	Rancho El Sansal	1834	Salinas, Calif. U. S. A.
Pepper-Grass, <i>Lepidium nitidum</i> Nutt.	San Vincente Ferrer	1780	San Vincente, B. C. Mexico
	Rancho El Sansal	1834	Salinas, Calif. U. S. A.
Lupine, <i>Lupinus micranthus</i> Dougl.	San Vincente Ferrer	1780	San Vincente, B. C. Mexico
Bur Clover, <i>Medicago hispida</i> Gaertn.	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
Yellow Melilot, <i>Melilotus indica</i> All.	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
Cow Clover, <i>Trifolium involu-cratum</i> Ort.	San Fernando Rey de Espana	1797	San Fernando, Calif. U. S. A.
White-Tip Clover, <i>Trifolium variegatum</i> Nutt.	San Fernando Rey de Espana	1797	San Fernando, Calif. U. S. A.
<i>Trifolium olivaceum</i> Green	Rancho Vallejo	1834	Petaluma, Calif. U. S. A.
<i>Trifolium microcephalum</i> Pursh.?	San Antonio de Padua	1771	Jolon, Calif. U. S. A.
Yellow Sorrel, <i>Oxalis corniculata</i> L.	Rancho La Natividad	1837	Salinas, Calif. U. S. A.

Name	Building	Date of Foundation	Locality
Red Stem Filaree, <i>Erodium circularium</i> L'Her.	San Antonio de Padua	1771	Jolon, Calif. U. S. A.
	Santo Domingo	1775	Santo Domingo, B. C. Mexico
	San Vincente	1780	San Vincente, B. C. Mexico
	La Soledad	1791	Soledad, Calif. U. S. A.
	San Fernando Rey de Espana	1797	San Fernando, Calif. U. S. A.
	San Jose de Guadalupe	1797	Mission San Jose, Calif. U. S. A.
	San Juan Bautista	1797	San Juan, Bautista, Calif. U. S. A.
	Rancho El Sansal	1834	Salinas, Calif. U. S. A.
	Rancho Vallejo	1834	Petaluma, Calif. U. S. A.
	Rancho La Natividad	1837	Salinas, Calif. U. S. A.
<i>Erodium</i> sp. L'Her.	Rancho El Sansal	1834	Salinas, Calif. U. S. A.
Spurge, <i>Euphorbia</i> sp. L. (Seeds different from any in Smithsonian herbarium.)	San Jose de Guadalupe	1797	Mission San Jose, Calif. U. S. A.
	San Francisco de Solano	1824	Sonoma, Calif. U. S. A.
	Rancho El Sansal	1834	Salinas, Calif. U. S. A.
	Rancho Vallejo	1834	Petaluma, Calif. U. S. A.
	Rancho La Natividad	1837	Salinas, Calif. U. S. A.
Cheese Weed, <i>Malva parviflora</i> L.	Santo Domingo	1775	Santo Domingo, B. C. Mexico
	San Vincente Ferrer	1780	San Vincente, B. C. Mexico
	La Soledad	1791	Soledad, Calif. U. S. A.
	San Fernando Rey de Espana	1797	San Fernando, Calif. U. S. A.
	San Jose de Guadalupe	1797	Mission San Jose, Calif. U. S. A.
Cactus, <i>Opuntia occidentalis</i> Engelm. & Bigel. (Three types of seed were			

Name	Building	Date of Foundation	Locality
found; a large smooth one, a small smooth one, and a small pitted one. See above under Crop Remains from Various Historic Buildings.)			
Giant Cactus, <i>Cereus gigantea</i> Engelm.	San Fernando de Velicata	1769	San Fernando, B. C., Mexico
	San Vincente	1780	San Vincente, B. C. Mexico
Carrot, <i>Daucus carota</i> L. (See above under Crop Remains from Various Historic Buildings.)			
Morning Glory, <i>Convolvulus arvensis</i> L. (Seed of doubtful age; may represent recent intrusion.)	Rancho La Natividad	1837	Salinas, Calif. U. S. A.
Phlox? <i>Phlox</i> sp. L. or <i>Gilia</i> sp. R & P.	San Antonio de Padua	1771	Jolon, Calif. U. S. A.
	Santo Domingo	1775	Santo Domingo, B. C. Mexico
	San Fernando Rey de Espana	1797	San Fernando, Calif. U. S. A.
	Rancho El Sansal	1834	Salinas, Calif. U. S. A.
	Rancho La Natividad	1837	Salinas, Calif. U. S. A.
Chinese Pusley, <i>Heliotropium curassavicum</i> L.	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
<i>Solanum</i> sp. L.	San Fernando de Velicata	1769	San Fernando, B. C. Mexico
	La Soledad	1791	Soledad, Calif. U. S. A.
Prickly Sow Thistle, <i>Sonchus asper</i> L.	San Antonio de Padua	1771	Jolon, Calif. U. S. A.
	Santo Domingo	1775	Santo Domingo, B. C. Mexico
	San Jose de Guadalupe	1797	Mission San Jose, Calif. U. S. A.
	San Francisco de Solano	1824	Sonoma, Calif. U. S. A.
	Rancho El Sansal	1834	Salinas, Calif. U. S. A.
	Rancho La Natividad	1837	Salinas, Calif. U. S. A.
Spikeweed, <i>Centromadia pungens</i> (T. & G.) Greene	San Antonio de Padua	1771	Jolon, Calif. U. S. A.

Name	Building	Date of Foundation	Locality
Tarweed, <i>Hemizonia congesta</i> D. C.	San Vicente Ferrer	1780	San Vicente, B. C. Mexico
Chile Tarweed, <i>Madia sativa</i> Molina	San Antonia de Padua	1771	Jolon, Calif.
	Rancho El Sansal	1834	Salinas, Calif. U. S. A.
	Rancho La Natividad	1837	Salinas, Calif. U. S. A.
Napa Thistle, <i>Centaurea melitensis</i> L.	San Fernando Rey de Espana	1797	San Fernando, Calif. U. S. A.
	Rancho La Natividad	1837	Salinas, Calif. U. S. A.
Composite	La Soledad	1791	Soledad, Calif. U. S. A.
Nut-like fruits (Undetermined)	Santo Domingo	1775	Santo Domingo, B. C. Mexico
	La Soledad	1791	Soledad, Calif. U. S. A.

## FIELD CROP DETERMINATIONS

*Propo wheat* has been found in twelve of the fourteen buildings examined and appears to have been the most extensively grown wheat variety throughout the region during the Spanish and Mexican periods. The specimens are uniform in type and appear to be identical with those of the variety as it is known in California today. Previously, the introduction of this variety into California has erroneously been thought to have occurred in about 1870.<sup>4</sup>

*Little Club Wheat.* The introduction of this now prominent variety has previously been assigned to the period of about 1860, when it was thought to have been acquired through trade with Chile,<sup>5</sup> but its abundant occurrence in numerous buildings erected in California, Arizona, and Sonora during the eighteenth century pushes back the known period of arrival a century, and definitely

<sup>4</sup> Charles F. Reed, "Proper and Pride of Butte Wheats," in the *Pacific Rural Press*, XVIII (1879), 280. Also G. W. Shaw and A. J. Gaumnitz, "California White Wheats," *California Agricultural Experiment Station Bulletin* 212 (1911), 318.

<sup>5</sup> J. Allen Clark, John H. Martin, and Carleton R. Ball, "Classification of American Wheat Varieties," *United States Department of Agriculture Bulletin* 1074 (revised August, 1923), 174.

establishes the introduction from Mexico through the agency of the Spanish missionaries.

*California Club Wheat.* An unknown club variety has been found in mixture with Little Club and Propo in several buildings and has occurred in a relatively pure condition at Soledad. It does not correspond exactly with any of the present day club varieties and is thought to be the bearded red-chaffed club wheat reported by Davis<sup>6</sup> to have been grown in California at the time of the American occupation, and then known as California Club. The specimens answer the following description: Spike awned, dense, erect; rachis stout, tomentose; internodes 3 mm.; glumes brown, midlong, wide; shoulders midwide, rounded; beaks wide, 2 to 5 mm. long; kernel red, short, humped.

Another unknown wheat variety resembling Pacific Bluestem has been found in scant mixture with Propo and Little Club, but the fragmentary nature of the material does not admit of exact description or identification.

*Coast barley*, identical in type with the now widely grown variety of that name, has been found in twelve of the fourteen structures examined, indicating a continuous culture in the region throughout its agricultural history.

*Oats* of both the byzantina and sativa types have been found, but only as solitary kernels in mixture with large quantities of wheat and barley. Evidently the cultivated oat first appeared in California as an impurity in wheat and barley and was not grown per se until toward the close of the Spanish period.

*Wild Oats.* No positive identification of either *Avena fatua* or *Avena barbata* has yet been made, although a single damaged kernel resembling the former has been taken from the pulpit stair of the "old church" of the Mission San Juan Bautista, erected during the period 1805 to 1813. Presumably the present wide and abundant distribution of these two species in California has occurred since the Spanish period.

*Indian Corn.* The three cob fragments which have been found all indicate that the maize of the Spanish period was a small eight-row flint variety.

*Fiber plants.* Several specimens of hard or leaf fibers have

<sup>6</sup> Horace Davis, *op. cit.*, 518.

been found, but no examples of the soft or bast group have yet come to light. A braided specimen of yucca was taken from the Mission San Cayetano del Tumacacori in Arizona, and a similar specimen of maguey, *Agave sp.*, from San Fernando de Velicata in Lower California. The other indications of fiber plants from San Fernando consist of seed and fragments of yucca-like leaves containing fiber and pith in an unprepared form, and were doubtless used for binding material in brick making. This is the prevailing type of vegetation in the vicinity of that mission, and offered the most available organic material. Several fiber and seed specimens of sedge, *Cyperus sp.*, and of tule, *Scirpus sp.*, were found in Alta California, but these were apparently employed in brick making rather than as textile or cordage material.

#### FRUIT CROP DETERMINATIONS

*Olive pits* from six historic buildings, as well as those from the old tree specimens still growing at these and other sites, all exhibit wide variability in type, ranging from small smooth to large deeply-furrowed and pointed pits. Presumably the modern mission variety, which is uniformly of the latter type, has originated through vegetative propagation from an original mixed seedling stock.

*Grape seeds* of the mission type have been found in two localities, but from the historic literature it is known that several other varieties were brought to Mexico prior to the middle of the eighteenth century, but whether or not any of these were grown in California during the Spanish period has yet to be determined.

*Fig.* Four small mumified *fig fruits* have been taken from the church walls at Velicata in Lower California, but these serve only to prove that this crop was grown there during the latter part of the eighteenth century.

The *prickly pear* was both wild and cultivated in Mexico at the time of the conquest, but it is not known what its range was or at what time and by what means it arrived in Alta California. The finding of seeds in four mission buildings in Upper and Lower California establishes new early dates for its presence in these localities, and suggests its early dissemination northward through the agency of the missionaries. Some of these seeds appear to



be of the species *Opuntia occidentalis* Engelm. and Bigel., but J. N. Rose of the Smithsonian Institution, who has examined them, has expressed the opinion that the seeds of *O. occidentalis*, *O. megacantha*, and *O. ficus-indica* do not possess sufficient character to admit of specific identification, but thinks that the seeds found in the older bricks would more likely be *O. occidentalis*.

A peach pit from San Vincente, Mexico, does not possess sufficient character to admit of a varietal identification, but judging from its thickness it was produced by a seedling tree.

#### GARDEN CROP DETERMINATIONS

A *bean seed coat*, resembling the Red Mexican and Pink varieties—both thought to be Spanish introductions—was found at Soledad, and a *pea pod*, inadequate for a varietal determination, was found at Sonora.

A *cucurbit* seed from the Dominican Mission at San Vincente, Mexico, appears different from any of the familiar cucurbits of the United States. This has been compared with specimens in various collections and herbaria, and while not identical with any of these it possesses the character of the family in sufficient degree to be classed among the *Cucurbitaceae*. Another *cucurbit* seed, taken from the foundations of the La Natividad Rancho, has been identified as that of a watermelon, while a third *cucurbit* seed from Soledad is too fragmentary to admit of even a genus identification.

Seeds of the carrot, *Daucus carota* L., were found at San Vincente and at Natividad, and while these do not admit of varietal identification they serve to confirm the observation of various writers that this vegetable was widely utilized in Spanish California.

#### ORNAMENTAL PLANT DETERMINATIONS

The finding of specimens of the rose, *Rosa* sp. L., the fan palm, *Livistona rotundifolia* Mart., the Osage orange, *Toxylon pomiferum* Raf., the bamboo, *Phyllostachys* sp. Sieb. & Zucc., the palo escopeta, *Albizzia occidentalis* T. S. Brandeg., and the Pepper Tree, *Schinus Molle* L., all tend to establish new early dates for the introduction of these species into the regions yielding them.

Palo escopeta, *Albizzia occidentalis* T. S. Brandeg., is considered



by Brandegee to be indigenous to Baja California, Sinaloa, and the Tres Mareas Islands, all of Mexico; and since it yields a useful structural wood and is of a hardy ornamental type, it seems probable that it may have been naturalized in the various mission gardens beyond its natural range. The brick specimen of this, while smaller, corresponds otherwise with the description of Brandegee and Standley, and also with the type specimens from the Mission San Jose del Cabo preserved in the Brandegee herbarium, and while the identification cannot be regarded as positive, the correspondence is so close that small doubt remains as to the identity of the specimen.

#### ALIEN WEED INTRODUCTION

The data given above under the heading Weed Remains from Various Historic Buildings provides new evidence regarding the early occurrence of both native and alien wild species in California and vicinity, but the aliens only are here discussed, and 34 of these have been grouped below according to their probable periods of introduction. This grouping, as explained later, is based upon the distribution of the material in the several structures yielding it and upon the manner of its association there with other crop and weed remains.

#### PROBABLE PERIODS OF INTRODUCTION INTO ALTA CALIFORNIA FOR CERTAIN ALIEN WEEDS

Pre-Mission Period Before 1769	Mission Period 1769-1824	Post-Mission Period After 1824
<i>Rumex crispus</i> L.	<i>Lolium multiflorum</i> Lam.	<i>Lolium temulentum</i> L.
<i>Erodium cicutarium</i> L'Her.	<i>Poa annua</i> L.	<i>Echinochloa crusgalli</i> L.
<i>Sonchus asper</i> L.	<i>Avena fatua</i> L.?	<i>Holcus halepensis</i> L.
	<i>Hordeum murinum</i> L.	<i>Polygonum aviculare</i> L.
	<i>Chenopodium album</i> L.	<i>Sisymbrium officinale</i> L.
	<i>Chenopodium murale</i> L.	<i>Raphanus sativus</i> L.
	<i>Amaranthus retroflexus</i> L.	<i>Brassica campestris</i> L.
	<i>Ranunculus repens</i> L.	<i>Brassica arvensis</i> L.
	<i>Brassica nigra</i> (L.) Koch.	<i>Melilotus alba</i> Desr.
	<i>Medicago hispida</i> Gaertn.	<i>Oxalis corniculata</i> L.
	<i>Melilotus indica</i> All.	<i>Convolvulus arvensis</i> L.
	<i>Malva parviflora</i> L.	<i>Marrubium vulgare</i> L.
	<i>Daucus carota</i> L.	<i>Anthemis cotula</i> L.
	<i>Madia sativa</i> Molina	<i>Cirsium lanceolatum</i> L.
	<i>Centaurea melitensis</i> L.	<i>Cirsium arvense</i> Scop.
		<i>Centaurea solstitialis</i> L.

The three species, *Rumex crispus*, *Erodium cicutarium*, and *Sonchus asper*, which are thought to have penetrated Alta California prior to colonization in 1769, have all been found in the oldest walls of several mission buildings in widely separated localities, where they have occurred frequently in the absence of other alien species, and occasionally in the total absence of cereal remains. These circumstances indicate to the writer that these species were probably present on these sites at the time of occupancy by Europeans, and this view is reinforced by the knowledge that these three species are aggressive and capable of penetrating and becoming established in remote localities, independent of man.

The fifteen above-named species, thought to have been introduced into California during the mission period (1769-1824), are not commonly associated with the above group in the oldest walls, but frequently begin to appear with them and with native species in later walls of the same buildings, where they are also commonly associated with the remains of cultivated crops. The circumstances are thought to indicate a later arrival and a gradual accumulation, which is in accord with the known habits of these weeds. Among them are typical grain field and human habitation weeds and two probable escapes from cultivation.

Fourteen of the sixteen above-named species, provisionally thought to be post-mission introductions—after 1824—although now abundant upon many of the mission sites, have not as yet been found in the adobe walls on any of these sites, and this is thought to indicate that they were not abundant in these places during the period of construction. A more thorough study of such sites however may yet establish the presence of some of them in certain localities during the mission period. The other two species included in this group, *Convolvulus arvensis* and *Oxalis corniculata*, have been found thus far only in Mexican period buildings (1824-1848) and have therefore been provisionally classified as post-mission introductions.

#### SUMMARY

A new type of evidence by means of which it has been possible to establish the identity of certain early crop introductions has

been presented and new light has been thrown upon the question of alien weed introduction. The amount of material thus far collected however has been very limited, consisting in some instances of only a few brick fragments, whereas the building from which this was taken may have contained hundreds of thousands of bricks made over a period of many years, and for this reason it is certain that further studies in which a larger quantity of material is systematically collected over a wider territory southward into Mexico will greatly add to and strengthen the findings which have here been recorded.

## NEWS NOTES AND COMMENTS

### "THE ROMANCE OF THE REAPER"

On May 8, 1931, members of the Agricultural History Society residing in Washington, D. C., and their friends had the pleasure of seeing the five-reel sound picture, entitled "The Romance of the Reaper," at the Motion Picture Laboratory of the United States Department of Agriculture. The film is sponsored by the McCormick family of Chicago on the occasion of the centenary of the invention of the reaper by Cyrus Hall McCormick. Later, on May 14, the film was shown to the members of the staffs of the libraries of the Department of Agriculture and also members of the class in the history of American agriculture, taught by Everett E. Edwards in the Graduate School of the Department. All who saw this historical picture are grateful to Herbert A. Kellar of the McCormick Historical Association and one of the founders of the Agricultural History Society, for his thoughtfulness in arranging for its showing in Washington.

### PERSONAL

Dr. A. M. Arnett, professor of history in the North Carolina College for Women, has been awarded a grant-in-aid by the Social Science Research Council for a study of the late Claude Kitchen and the later phases of the agrarian movement in North Carolina.

Dr. Solon J. Buck, president of the Agricultural History Society during 1929-1930, has resigned as superintendent of the Minnesota Historical Society and as professor of American history in the University of Minnesota. He will take up his duties in Pittsburgh on September 1, 1931, as head of the Western Pennsylvania Historical Survey, to direct the Historical Society of Western Pennsylvania, and to serve as professor of history in the University of Pittsburgh. The survey, which is financed by the Buhl

Foundation in cooperation with the historical society and the university, has been launched with a view to exploiting the history of Western Pennsylvania intensively and making the results of this research available to the public at several levels, ranging from that of the specialist to that of school children.

#### AGRICULTURAL HISTORY IN MINNESOTA

During the last of 1929, Frank E. Balmer, then State leader of county agents announced plans for the "establishment of a museum for agricultural history and records on the campus of the department of agriculture of the University of Minnesota." A committee appointed to consider the matter decided on an agricultural history exhibit as a feature of the Farmers' and Homemakers' Week, from January 20 to 25, 1930.

The Minnesota Historical Society's exhibit at the annual State fair in 1930 centered about the theme of the farmer in Minnesota history. It included agricultural implements, manuscripts, books, pamphlets, and pictures pertaining to the subject. A film of Minnesota farm scenes, made by D. A. Leonard of Minneapolis from originals in the society's collections was a feature of special interest.

#### AGRICULTURAL HISTORY IN TEXAS

Readers of *Agricultural History* will be interested in steps which are being taken in Texas to preserve the materials for the agricultural history of that great commonwealth. At the meeting of the Texas Agricultural Workers Association in January, 1931, T. C. Richardson, field editor of *Farm and Ranch*, introduced a resolution which provided for the appointment of a committee on agricultural history with instructions to "select material bearing on the agricultural, social, and economic development of Texas, to properly index such material, to ascertain what material exists in the libraries of State institutions at present, to secure an endowment by either public or private funds, to add to and perpetuate this collection and to make it available for all citizens of Texas." Mr. Richardson himself has spent several years

gathering material for an agricultural history of Texas, and in presenting this proposal he offered to donate his own collection to serve as the nucleus. The association enthusiastically adopted the resolution and the committee was appointed, consisting of about fifteen men and women in various parts of the State. Members of the committee and several other members promptly gave additions to the collection.

As chairman, Mr. Richardson has secured some rather valuable materials in the brief time since the committee was organized. The library has already received the literary remains of two horticulturists of international reputation, T. V. Munson and Gilbert Onderdonk. Munson was the viticulturist who saved the vineyards of France from phylloxera. Onderdonk's classification of the peach family is now the standard of the Department of Agriculture.

#### THE HADLEY FARM MUSEUM

The old Hadley Farm Museum, unique among historical institutions, was dedicated May 27, 1931, at the old Hadley Meeting House. Collections of farm implements and household equipment are displayed in the renovated historic Huntington barn, the gift of Dr. James Lincoln Huntington of Boston and Hadley. The museum, with its varied agricultural antiquities, which will eventually become the property of the town, is sponsored by Henry R. Johnson and Mr. and Mrs. Clifton Johnson. The speakers stressed the importance of the old barn and its unique collections as a means of presenting to the modern generation the significance of the past, so essential to an understanding of the relation of this past to the present and the future.

#### INVERNESS MUSEUM

In the *Scottish Geographical Magazine* for November 15, 1929, Alex M. MacEwen, provost of Inverness offers a brief statement concerning a museum at Inverness, Scotland. It is proposed to form a collection of photographs illustrating the daily life of the people of the Highlands. Views of old houses, shielings, agricultural implements, survivals of primitive methods of farming



and lay-out of farms, dress spinning, weaving, and the old craft processes, and illustrations of the economic and social life of the people, with attention to local variations, are being included. Mr. MacEwen says: "Our object is not to make a collection of archaeological or architectural pictures, but to endeavor to preserve, before it is too late, the relics of a past age which is fast vanishing." Miss Isabel Frances Grant, author of *Everyday Life on an Old Highland Farm*, has undertaken to select and arrange the collection.

#### DR. L. O. HOWARD AND ENTOMOLOGY

Under the caption "Dean of American Entomologists Has Retired from the Department" the *Official Record* of the United States Department of Agriculture for July 4, 1931, gives a summary of the notable career of Dr. Leland O. Howard, one of the world's leading authorities on entomology. The *Official Record* for June 27 announced Dr. Howard as the recipient of the Capper award for 1931 because of his distinguished service to agriculture in perfecting insect-control measures.

An editorial review of Dr. L. O. Howard's *A History of Applied Entomology; Somewhat Anecdotal* (Washington, 1930) and Professor E. O. Essig's *A History of Entomology* (New York, 1931) entitled "Two Recent Histories of Economic Entomology" appears in the *Experiment Station Record* for May, 1931. It may be recalled that the issue of *Agricultural History* for July, 1929, included an article by Dr. Howard on "The Rise of Applied Entomology in the United States."

#### BOOKS AND ARTICLES

The ninth part of Dr. O. E. Baker's series of articles on the Agricultural Regions of North America appears in *Economic Geography* for April, 1931. It is on the North Pacific Hay and Pasture Region. Another article of interest to agricultural historians is the one by L. A. Wolfanger on Abandoned Land in a Region of Abandonment.

The article on "The Agricultural Revolution in the United States, 1860-1930" by Professor Louis Bernard Schmidt of Iowa

State College in *Science* for December 12, 1930 is the paper which he presented before Section L—Historical Sciences, of the American Association for the Advancement of Science, Des Moines, Iowa, December 28, 1929. This paper is based on his earlier article, "Some Significant Aspects of the Agrarian Revolution in the United States" in the *Iowa Journal of History and Politics* for July, 1920.

A valuable article by John T. Ganoe, associate professor of history at Ohio State University, on "The Origin of A National Reclamation Policy" is included in the *Mississippi Valley Historical Review* for June, 1931.

Of value to American agricultural history is the article by John B. Appleton on "The Declining Significance of the Mississippi as a Commercial Highway in the Middle of the Nineteenth Century" in the *Bulletin* of the Geographical Society of Philadelphia for October, 1930.

The appendix of Oliver Stuart Homer's *The Master Farmers of America and Their Education*, issued by the University of Iowa as one of its Studies in Education, is devoted to a history of the master farmer movement.

A historical sketch of "The Young Farmers Movement" by Donald F. Armstrong appears in the *Cornell Countryman* for April, 1931.

Henry A. Pershing's *Johnny Appleseed and His Time; an Historical Romance* (Strasburg, Va., Shenandoah Pub. House, 1930, 379 p.) is a substantial addition to the literature on the eccentric hero, John Chapman, more commonly known as Johnny Appleseed.

A communication by Mrs. Lewis A. Watermann entitled "A German Gardener at Newport in 1754" in the *Rhode Island Historical Society Collections* for January, 1930, consists of nine-

teenth century translations of the letters of recommendation of a German gardener, Johann Caspar Öhlman.

A short article by Arthur F. Stone on "The Fairbanks Scale Centenary" in number 3 of the Vermont Historical Society *Proceedings* for 1930 (new series, v. 1, p. 135-140), gives an account of the celebration of the centenary of the building of the platform scale, an invention by Thaddeus Fairbanks and manufactured by the firm of E. and T. Fairbanks and Company for a hundred years at St. Johnsbury, Vermont.

Harold Fisher Wilson's article on "The Roads of Windsor" in the *Geographical Review* for July, 1931, has considerable material on the part the sheep and dairy industries have played in the history of the township of Windsor, Vermont.

Carl Raymond Woodward's *Agriculture in New Jersey* is an offprint of the four chapters on agriculture in *New Jersey—A History* (New York, Amer. Hist. Soc., 1930), edited by Irving S. Kull. There is a chapter on the agricultural history of New Jersey for each of four periods: colonial years; 1755-1810; 1810-1860; and 1860-1930. The chapters of this offprint are copiously illustrated and a list of references are appended to each. It forms a valuable supplement to the author's *The Development of Agriculture in New Jersey, 1640-1880: A Monographic Study in Agricultural History* and his series of articles entitled "Odd Bits of Agricultural History" in *New Jersey Agriculture*. Copies are available from the Bulletin Clerk of the New Jersey Agricultural Experiment Station.

An article by P. R. Kelbaugh on "The Tobacco Trade in Maryland, 1700-1725" appears in the *Maryland History Magazine* for March, 1931.

An article on "The Ante-bellum South: A Geographer's Interpretation" by A. E. Parkins is included in the *Annals* of the Association of American Geographers for March, 1931.

The *North Carolina Historical Review* for July, 1931, contains reprints of two old essays of interest to agricultural historians; the first, entitled "Essay on Agriculture. For the Gazette. Thoughts on the Theory of Agriculture—for the Farmers of North Carolina" is from the *North Carolina Chronicle; or Fayetteville Gazette* for July 19, 1790. The second is on "Cotton Cultivation" and is from the *Wilmington Gazette* for October 10, 1799.

"To Market with Hogs" by Belle Bailey in the *Palimpsest* for February, 1931, affords an account of the sale of 125 hogs to the Winnebago Indian mission in 1842 at \$1.75 per 100 pounds.

In his article entitled "Historical Note on Dimmit County, Texas" in the *Southwestern Historical Quarterly* for October, 1930, Paul S. Taylor indicates how this South Texas county has been transformed from an important stock country to an important agricultural community. He emphasizes railroad transportation and the utilization of underground waters as the chief factors bringing about this change.

"The Story of Charles Goodnight; Great Texan Cowman" by Owen P. White is included in the *Country Home* for May, 1931.

The issue of the *Culver-Stockton Quarterly* for January, 1931, is devoted to an extensive article by Harold E. Briggs on "The Development of Agriculture in Territorial Dakota." It is chiefly a historical sketch of the development of agriculture in the Red River Valley and what is now southeastern South Dakota during 1860-1890.

J. L. R. Waller's article on the "Economic History and Settlement of Converse County, Wyoming" appeared in issues of the *Annals of Wyoming* for January, April, and July, 1930.

J. W. Hoover's article on "Navajo Nomadism" in the *Geographical Review* for July, 1931, includes material on the agriculture of the Navajos.

The *Dalhousie Review* for January, 1931, contains a narrative of homesteading in the Peace River district by E. B. Fairbanks entitled "In the Peace River District."

In a brief article on "The Manorial System in England and the Enclosure Movement" in the *Historical Bulletin* for January, 1931, Robert J. Stenson summarizes the manorial and Teutonic theories of the origin of the manor and then gives a description of the fully-developed system. He also compares the 16th century enclosure movement with that of the 18th.

Under the title "A Great Agriculturist: Edward Strutt" in the *Nineteenth Century and After* for April, 1931, Lord Ernle gives an appreciation of Edward Gerald Strutt, who died on March 8, 1930, at the age of seventy-five. By way of introduction Lord Ernle says: "By his death English agriculture lost its most sagacious leader. Not only was he the foremost man of his generation, but his name is comparable only with those of the historic leaders of the eighteenth century."

*History of British Friesian Cattle* (London, 1930), published by the British Friesian Cattle Society and issued "to mark its 'coming-of-age,'" includes details, facts and figures relating to these cattle, and statistical and historical information concerning their pedigrees.

The article by E. Parmalee Prentice on "Type in the History of Dairy Cattle" in the *Nineteenth Century and After* for June, 1931, is devoted to the situations in the dairy world today "created by the insistence of the dairy breed associations upon show points described in their various score-cards, and upon the general form, or 'type,' which an animal having these points presents."

Marc Bloch's "La Lutte pour l'Individualisme Agraire dans la France du XVIII<sup>e</sup> Siècle. II. Conflits et Résultats" in *Annales d'Histoire Économique et Sociale* for October 15, 1930, is a

second instalment of a study of the struggle for agricultural individualism in France during the 18th century and pertains to conflicts and results.

A brief article by A. P. Hansen on "The Transformation and Development of Danish Agriculture; Rise and Growth of Cooperative Dairies" appears in the *Danish Foreign Office Journal* for March, 1931.

As the title indicates, the article by Fritz Popelka on "Die Lebensmittelpreise und Löhne in Graz vom 16. bis zum 18. Jahrhundert" in *Vierteljahrsschrift für Sozial-und Wirtschaftsgeschichte* for 1930 (v. 23, p. 157-218) is a study of wages and cost of food in Graz from the 16th to the 18th centuries. It is based largely on the tax lists.

The article by Ch. Watis on "Die Agrarfrage und die Agrarreform in Griechenland" in *Agrar-Probleme*, bd 2, hft. 3-4, 1929, p. 661-684, issued by Internationales Agrar-Institut, Moscow, considers the agrarian problems of Greece in the 19th and 20th centuries.

The editorial note on "The Dairying Industry in the Economic Transformation of New Zealand" in the *Geographical Review* for July, 1931, affords access to several bibliographical items containing material on the agriculture of New Zealand.